THE
VETERINARY RECORD.
The Official Journal of the National Veterinary Medical Association of Great Britain and Ireland, Limited.
FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 2. JANUARY 14, 1922. VOL. 2.

Veterinary Science and Medicine.

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(Presented to the Western Counties V.M.A.)

Much has been written and spoken recently concerning the desirability of establishing a closer relationship between human medicine and veterinary science. Most seem to agree that such a relationship is required as a means of benefitting not only ourselves, but medical science generally. How it is to be achieved is another matter. Personally, I always think a review of our educational system helpful in a problem of this kind, and it is upon this that I intend offering a few remarks this afternoon.

Some years ago, I was given a bit of advice by a political friend. It was to the effect that if I had an opponent whose feet I was anxious to place upon the slippery slope I should persuade him to introduce an Education Bill. Such is the attitude of politicians towards the knotty problem of National Education. In a lesser degree much the same might be said regarding an attempt to evolve anything approaching an ideal system of education for a single profession. One is faced with difficulties at every angle.

If I may say so without disrespect to other professions, it is my opinion that this is particularly the case when the education of the veterinary profession comes under survey. There are certain peculiar features which render a satisfactory solution difficult. One is that in the British Isles, at least, it is—amongst the great professional divisions of education—regarded by Government Departments and by Institutions and individuals who should know better, as of a kind *sui generis*. It has never yet been given a definite place in our national education scheme. Consequently, when grants are being distributed out of public funds, veterinary education is conveniently lost, and the astonishing fact to me is, that it has existed at all in England for such a time without assistance of this kind.

I don't think this could be said of any other branch of professional education. Since its foundation, veterinary education in England has been governed by considerations of finance. Finance has always been the first consideration, and to it educational efficiency has, of necessity, been regarded of secondary importance.

It is not surprising that efficiency has suffered. It is not surprising that our system will not stand examination. It came as no astonishment to me at all to learn that the Departmental Committee on the Public Veterinary Services reported that the preliminary scientific training of the veterinary student was not satisfactory.

On March 30th, 1920, Sir Arthur Boscawen stated to a House of Commons Committee that our country was the greatest live stock producing country in the world. Sir Arthur was the Parliamentary Secretary to the Ministry of Agriculture—he should know. If his claim be true, then the deplorable position of veterinary science amounts to a public scandal.

In the greatest live stock producing country in the world the annual output of qualified veterinary surgeons is much lower in proportion to the population than in any other country of standing.

I have endeavoured to urge this glaring insufficiency before—at Newcastle, last year,—and I do so again. The figures are the more remarkable when it is noted that, in the figures relating to our country, the population of the British Isles only is taken into account, while a considerable percentage of our output of veterinary surgeons goes to India, the Crown Colonies and the Protectorates.

I have further stated that it was given in evidence before the Royal Commission on University Education in Wales that, in the area of one of the Welsh Colleges, no fewer than 90,000 sheep died each year, without any attempt being made to ascertain the cause of death, and that in some years the number amounted to 300,000. What effect this existence of disease in one species has upon common and troublesome human diseases we have at present no means of ascertaining. (No one could estimate the important bearing which research on diseases in the lower animals with similar manifestations might have upon our knowledge of even such common and destructive diseases as measles and scarlet fever, about which our knowledge is still so imperfect). But, regarded purely from the commercial standpoint, we observe that this is taking place in the part of the British Isles which has been endowed by nature with the finest indigenous live stock in the world. There is no mutton equal to that produced by the Welsh wether. There are no cattle superior to the Black Welsh for meat and milk producing qualities combined, while every horseman is familiar with the matchless stamina of the native Welsh horse. Yet these treasures of nature are allowed to die off without any attempt being made to preserve them. Not a penny is expended on veterinary education, as such, in Wales. Almost 70 per cent. of young Welshmen pass through the University of Wales in

the Faculty of Arts—it has been cynically referred to as the University which produces preachers and teachers. It has certainly not yet contributed to veterinary science. Such is the care which one part of Britain has bestowed upon its greatest natural endowment.

This chaotic state is not due to a want of appreciation of the value of the commodity which live stock represents. It is not due to gross disregard for animal life—at least, such is my opinion, and I have moved freely among this people from childhood. It is due to the fact that veterinary education is not part of that great education machine which they have come to admire, and has been lost. There has been no one in Wales connected with education with sufficient vision to constitute himself a pioneer and take paternal charge of this branch.

The centres for veterinary education are placed in London, Liverpool, Edinburgh, Glasgow and Dublin. These are the only centres which have the power to teach. Only one of our universities has an Intramural School.

Alongside this retention of the power to restrict the centres for training we have witnessed, since 1903, the rapid development of our magnificent series of Provincial Universities—a University in almost every provincial town of note, opening wide the portal to every boy and girl to practically every profession, with the exception of veterinary science. Prior to this great university movement—*i.e.*, in the predominant days of Oxford and Cambridge—our facilities for entry compared fairly favourable with those of other professions. But to-day, when all other professions are readily accessible to our boys and girls, practically at their doorsteps and irrespective of the wealth of their parents, the opportunities for many to enter the veterinary profession are inadequate. The development of the University system has meant that natural ability, and that alone, has become the passport to other professions. That is the way to maintain the professions virile. Why should this not be so of the veterinary profession? Before the Departmental Committee on the Public Veterinary Services, it was stated to a witness—"What you claim is that, owing to the distribution of our centres, we do not get a fair proportion of what we sometimes call the best brains of the country." Witness—"Exactly." This is true, and it is detrimental to the national interest and to the interest of veterinary science to mince matters.

No vested interest should stand in the way of reform here—the price of a slightly soiled battleship would buy up all the vested interests represented by veterinary science in this country. To talk of research work, scholarships for post-graduate students, the necessity for post-graduate diplomas, etc., is all moonshine. The first and fundamental step is to secure for us a fair proportion of the best boys and girls of the country. "A1" post-graduate and research workers cannot be made out of "C3" undergraduates.

It is desirable to divert some of the undoubted ability which is now drifting into channels to which there is no outlet, into the field of veterinary science.

Without the slightest hesitation I say that it is not only desirable, but it is essential that something of this kind should be done, and done quickly. I happened to be Chairman of a Committee to which had been delegated the task of replying to a Government enquiry into the probable expansion or contraction of the profession in the future.

In 1914 I wrote:—

I understand that, at least as far as one of the three Welsh Colleges is concerned, there are no official statistics available showing what becomes of the Graduates. Yet what could be more helpful to those in authority? Such statistics would provide the only sure basis upon which advice could be offered a boy who was hesitating what line of study he should make his life-work. It is a step in which the boy has every right to expect guidance from those at the top. He must not be left to take it alone. In the case under consideration, is it reasonable to expect the South Wales boy to pass the University College, Cardiff, and the University of Bristol, which are practically at his doorstep, and come to Liverpool or go to London to secure entrance to the profession of his choice. It is not reasonable, and, as a matter of fact, he does not pass them, but enters into one of the branches of work for which local provision is made without any consideration as to the state of the market in that branch.

Having long held this view, I heartily welcomed the question which the Government had addressed to us. It was a question, the answer to which, so far as was possible, should have been in possession of the Government Departments if they wished to place to the best advantage the many thousands of men returned from the war—a question, the answer to which should be supplied by every profession.

We enquired into the possible future needs of the Ministry of Agriculture, Ministry of War, Colonial Office, India Office, etc., and we also made an estimate, based upon a reasoned statement by an expert, as to the needs of an adequate Public Health Veterinary Service.

They were:—

(1) *The Ministry of Agriculture*—Estimated their future needs at four Veterinary Surgeons a year.
(2) *The needs of the Ministry of War*—were about fifteen a year.
(3) Other Government Departments simply stated the appointments which they were now making. Such statements were not of much value to the committee, but the Colonial Office added that there would be considerable developments in the Colonial Veterinary Service.
(4) It was found that the number of whole-time Veterinary Officers in the Public Health Service was under 50, so that, with the exception of a few progressive municipalities (*e.g.*, Manchester, which employs 5), a Veterinary Public Health

Service could be said to be practically non-existent. The expert's estimate for an adequate service was one thousand men. This was confirmed by an independent opinion, which gave 500 men as the number which could, with national advantage, be absorbed by this Service within the next four years.

(5) The Committee found that, whilst the rapid development of motor traction would diminish horse practice, particularly in certain town practitioners, practice generally should not decrease, but rather increase.

The Committee came to the conclusion that there is a vast amount of work which is, with national advantage, legitimately performed by the veterinary profession in many other countries, but which, in this country, is not performed at all—and a vast amount performed by unqualified persons—and the committee unanimously reported that the veterinary profession is capable of considerable expansion as the nation becomes educated as to the real value and advantage to the public of an adequate fully-qualified veterinary service. This is the kind of information which should be in the hands of every Secondary School Master and University Head.

There is some explanation here in the findings of the committee of the extraordinarily low annual output of veterinary surgeons in this country as compared with others. In our conception of an adequate veterinary service, we are the most backward of all the great countries in the world. Only last year I saw, in an Italian official publication for 1910, that the veterinary service of Italy employed more than three thousand qualified veterinary men—the number for the British Isles for that year was just over 3,000. This included registered, but otherwise unqualified practitioners, and all men qualified in this country, but working in different parts of the Empire.

Where does the blame rest for our backwardness? If you try to lay the blame upon any Government Department, you find that no one claims us. When we have some benefit to confer, or when some Government Department has some chestnut to pull out of the fire, we are readily sought. But when we require funds for our legitimate development we are politely informed that it has not been the policy of that Department to make grants for such a purpose, or that this work does not come within the province of their Department, or given some other such unsatisfactory reply.

We, who have made veterinary education our life-work, want to know where we stand. We find that in other countries it is not buffeted about in this manner, but that it is sought after by different Departments and by different University Faculties. In South Africa, for instance, a controversy has for some time been proceeding between two of the biggest educational centres, as to which had the better claim to veterinary science. The point was as to whether veterinary science belonged to agriculture, or whether it should be regarded as a division of the science of medicine. A conclusion on a question of this kind can only be arrived at after an examination of the curricula for degrees in agriculture, veterinary science, and medicine. As a matter of comparison, if you draw up a table with three columns, giving the subjects taken in the various years in agriculture, veterinary science, and medicine, you will find that the result at a glance will be most interesting and instructive. A most casual observation can only lead to one conclusion, and that is that the curriculum for a degree in veterinary science runs closely parallel to that for a degree in medicine, that the affinity between the courses in agriculture and veterinary science is very slight, and that, judging from the requirements of the curricula for degrees, practically the same type of student, with equal mental calibre, is required for veterinary science as for human medicine. The training in the preliminary foundation sciences is the same, whilst the courses of study are equally protracted. This is confirmed by the findings of Lord Haldane's Royal Commission on University Education, which states that "the modern veterinary surgeon should proceed through an exacting programme of education, a course of training as specialised and as thorough as that of the student of human medicine, and, further, a future development of veterinary medicine depends upon its adoption of the methods of dealing with disease that have been worked out for human pathology. In their turn, also, many human diseases have proved to be closely associated with animal disease."

The Commission considered that research in animal disease must, of necessity, be associated with research in human disease, and that a department dealing with animal disease has become almost as necessary to a school of investigation in human medicine as the association with human pathology is to investigation in animal disease.

I regard this pronouncement, by no less an authoritative body than a Royal Commission, as the most important pronouncement on the scientific position of our work in our time. It was made in 1918—it links our work definitely with medicine and puts it on an equal plane.

This cannot be said of agriculture. Any suggestion that veterinary science should naturally fall completely under the jurisdiction of the Ministry of Agriculture as being the most appropriate Government Department cannot be substantiated. The case for the Ministry of Health is a hundred times stronger—the future veterinary absorptive capacity of the Ministry of Health is, according to the estimates given, more than five times as great as that of the Ministry of Agriculture.

The scientific study and control of disease, in whatever species disease manifests itself, should be under one Ministry, and that the Ministry of Health. We do not want rabies in animals under the Ministry of Agriculture and hydrophobia in man under the Ministry of Health. It has been pointed out that, as the light of research is shed upon contagious disease, so do we find that the number of diseases which are not communicable from one species to

another, including man, becomes reduced. It is obvious, therefore, that disease in man and disease in the domesticated animal, even though they may be in separate departments, should be under the same Ministry.

The curriculum for degrees in veterinary science represents a course which, for duration and intensive study, is second to none in any of our Universities. Why, then, does it not receive the same recognition? Why were candidates reading for this degree dealt with by the Ministry of Labour? I yield to no man in my respect for labour. I have every sympathy with labour. This is not the point—the point is, why were candidates for a veterinary degree singled out from all others? If a veterinary degree is not considered representative of the highest education, then I will ask those responsible for the classification upon what principle their classification is based.

I do not wish to say, and I do not think, that the hopeless position in which we find veterinary education is brought about intentionally by the Ministers. It is rather due to the policy of drift which has been allowed to develop so that neither the public nor the Ministers themselves can definitely fix responsibility.

We want this anomaly removed. Let the Ministry of Health assume its proper responsibilities here. Then we shall progress alongside the other professions. If this comes about, then it is very certain that the time is not far distant when we shall be assessed at our true value and our close relationship to and position in medicine more appreciated.

It is with no little diffidence that one ventures to address you on this subject at present, inasmuch as there is always some danger lest a want of diplomacy might lead to an estrangement between the representatives of branches of a science at a time when the object is to bring those representatives closer together.

Some of us have been advocating this closer relationship more or less energetically during the last 10 or 15 years. Advocacy of this kind always requires a high degree of delicacy, for, on the one hand, there is perhaps a tendency to regard a young and vigorous profession as an intruder in a field where a much older profession has regarded itself for centuries as holding sway. On the other hand, the young profession has found part of that field being naturally "pegged out" for it by the community, slowly, but nevertheless surely.

I ask you to believe me when I say that I speak firstly, lastly, and all the time, as a veterinary surgeon—one who is proud of the profession of his choice, and one who believes in its future. If I did not believe in it I would get out of it and make way for those who did. We cannot make a profession and keep it abreast of other learned professions unless we have faith in its possibilities. There are some in it, I hear, who have no real use for the profession, and who constantly refer to those who have as optimists and idealists. I would simply ask you to take a survey of the history of other professions which have become great, and you will have no difficulty in deciding which of these two types of members has been the means of placing those professions where they stand to-day.

For the last 17 years it has been my privilege to work alongside members of our sister profession of human medicine. I have been in the closest association with them as a member of their faculty. With them I have been in the conflict of debate on scores of occasions. This must necessarily be so if men have opinions of their own and have the courage of their convictions. The outcome of this experience to me has been that I have become more and more impressed as time went on with the "oneness" of medicine—with the fact that there is one great science of medicine, of which the workers in human medicine and the workers in veterinary medicine are indispensible attributes. I feel this is very surely becoming appreciated by our colleagues in human medicine. When I say this, I refer to medical colleagues who matter. There are "small men" in every profession. The medical profession is not without them, and these are the men who rely on the great tradition of human medicine to carry them through. But the men who made that tradition are not of that type, and they are the men who are making that tradition still greater. Of the men of my acquaintance there was no one who had a higher appreciation of the work of the veterinary surgeon than the late Sir Robert Boyce. Here was one who was ever ready to stand up and fight for our cause. He had nothing to gain other than the advancement of medical science, for his reputation was world-wide as one of the founders of tropical medicine. Again, one of the proudest moments of my life was when I heard veterinary science and veterinary students eulogised by Professor Sherrington in a manner which we could scarcely as much as hope they deserved. He spoke as my colleague for many years, but now Wayneflete Professor at Oxford, and the holder of no less exalted a position than that of President of the Royal Society—the leading scientific position in the world. His successor—Professor Macdonald—is quite as appreciative. I could go through a series of names of gentlemen—including Deans Monsarrat, Beattie, Macdonald and Kelly—with whom I served throughout their tenure of office. From each I received nothing but unqualified assistance in furthering any scheme for the advancement of veterinary education. Such men as these are making human medicine. When I recall their innumerable acts of kindness and encouragement I have not the slightest difficulty in forgetting tiny pinpricks of "smaller" men, of which we have all had experience and which might otherwise keep us apart.

We have ever to remember that we belong to the younger branch, and work in what some would regard as a humbler division of the science. This makes our work a target for attack by some. But humility is the very soul of a real education. There was no more humble person than Pestalozzi, and he was one of the makers of modern education. He endeavoured to instil as part of the make-up of the educated person, a respect for work in every sphere.

Please do not think I am endeavouring to write a eulogy of medical men. I am simply searching for evidence from amongst themselves that they are beginning in this country to formulate a just conception of the branch which we represent.

In the early history of veterinary science in this country there is no doubt but that much interest was taken in it by the medical faculty. We find that courses of lectures were delivered in medical schools, 20—30 years after St. Bel settled here. In the early thirties of last century, Youatt was lecturer at the University College (University of London). There is no doubt that, up to the latter part of last century, there was the closest affinity between us. Then came a long period of almost complete estrangement. To what this was actually due I will not pretend to say, but it synchronised with attempts on our part, through a series of Acts and Charters, to place ourselves and our work in a kind of water-tight compartment. Whether this was good for our own development we have to judge.

It has not been the policy of other countries, where there were no vested interests standing in the way of modern development and where progress during the last two or three decades has been most rapid.

It is interesting to note what has been happening to us during this period. If you examine the question closely you will find that we have been drifiting almost entirely towards the Ministry of Agriculture. In my judgment this has been much to our detriment, for we are wrongly placed. It is up to us to see that our position is more clearly defined. It is not to be expected that the Ministry of Agriculture would attach a true value to our potentialities for the country *as a whole*. This Ministry would regard us as a means simply of curing and protecting live stock, and our service here, great as it undoubtedly is, can always be, and is, reduced to terms of L.S.D.

If veterinary science be more closely allied to medicine, then it will be seen in its true perspective as an essential instrument in the protection of man himself. And this is its highest function. The monetary estimate disappears, for you will not find the boldest of our politicians bold enough to estimate the loss to the nation of a single human life.

Furthermore, more closely allied to medicine, it might become part of our great national scheme of education. This is the tendency of all modern developments in veterinary education. Look where you will—Australia, New Zealand, Egypt, South Africa, India, Brazil, U.S.A. (where every proprietary school for veterinary surgeons, without exception, disappeared during the war), and Japan, about which I had an interesting discussion with Major Fugii, of the University of Tokio, recently—you will find on every hand evidence of virility, a desire for reform, and endeavour to keep abreast with modern standards in other branches.

We, in the old country, cannot afford to stand still. With the object of taking that position in medical science which is legitimately ours, and to create a national respect for the branch of the science which we represent, we must provide in sufficient numbers men stamped with the hall-mark of scientific proficiency as high as can possibly be obtained. Then will the army of unqualified and incapable, which some in Agriculture seem to take pride in preserving, be eliminated to the great advantage of the community which we serve.

Diseases of the Reproductive Organs with their Sequelæ in Dysentery, Pneumonia, and Pyo-septicæmia of the New Born.

By L. C. Maguire, Capt. F.R.C.V.S., Fairford, Gloucester.

I consider the present time most opportune to bring to the notice of the veterinary profession the enormous prevalence and seriousness of the various diseases of the reproductive organs as they exist to-day in the live stocks of this country. I say the present is an opportune time, because it is the beginning of a new breeding season, and by adopting scientific methods to remove the existing diseases before infected animals are put to breed, not only will there be an economic saving in mating clean, healthy, fertile animals which, previous to treatment, were probably sterile and in the majority of cases unhealthy, but also in preventing in the new born of those animals, the sequelæ of the diseases present in the parents at the time of mating.

Let us first consider the various diseases of the generative organs, from which in one form or the other, I consider over 80 per cent. of our breeding animals suffer. I refer chiefly to the bovine and equine species, chiefly to the bovine.

For facility of description I shall begin at the external opening of the genital organs.

Vulva.—This is very commonly the seat of nodular venereal disease—in a vast number of cases so slight that a careful examination must be made before the presence of the characteristic nodules in the mucous membrane can be detected. At certain times and under certain conditions this mild form becomes acute, when there are masses of nodules coalesced to form a raised, intensely inflamed, nodular surface. The lesions in this stage commonly extend into the vagina. There is often a yellowish muco-purulent discharge from the vulva lips. Between the mild and acute forms all stages of the disease are found. The act of coitus greatly exacerbates the condition. From practical experience, I consider 90 per cent. of cows and heifers in this country suffer from this disease in one form or another.

Vagina.—The commonest lesion of the vagina, omitting the previous infection, is inflammation of its mucous membrane. This is commonly brought about by some irritant or traumatic lesion, such as is seen commonly after parturition, where the mucous membrane becomes torn and bruised, to be followed by either a necrotic or gangrenous vaginitis. Of irritants, the commonest one to be found is the practice of douching the uterus after parturition or the vagina, with strong irritant antiseptics. The

vagina is one of the most susceptible organs of the body to irritants of any kind. The common sequelæ to vaginitis is atresia. I have seen this atresia so pronounced, that it was impossible to pass two fingers into the vagina until the adhesions were broken down. Another disease, which attacks both vulva and vagina, and which is frequently seen, is vesicular venereal disease. In this condition there is an intense inflammation of the mucous membrane of vulva and vagina. The labiæ of the vulva are swollen, later vesicles form on the mucous membrane, which finally becomes purulent. There is a viscid purulent discharge which tends to stick the sides of vulva and vagina together. The discharge is commonly the result of the rupture of the pustules, each of which leaves an ulcer. The animal exhibits much pain, which is very intense during and after micturition. This disease may also be followed by adhesions of wall of vagina causing atresia, which, if not attended to, may become permanent. The disease is highly contagious, the course is brief and stormy. Spontaneous recovery occurs generally in from ten to thirty days. A bull which has come in contact with a cow suffering from this condition is certain to become infected. The same applies to nodular venereal disease.

Another disease frequently met with in white heifers is the anatomical abnormality of persistent hymen—this condition is known as "white heifer disease." It seems to occur only in white animals.

Cervix.—This is the commonest seat of lesions of all the reproductive organs. Lesions may occur here, ranging in any form from a very mild inflammation of the mucous membrane to an intense inflammation of this, extending to the deeper structures and resulting in severe sclerosis and enlargement of the part. Cervicitis in any but the very mild form is generally associated with endometritis. In clinical examination, there is commonly a muco-purulent discharge into the vagina. This, however, may be in very small proportion to the intensity of the lesions, for the mucous membrane may be so inflamed and thickened, anterior to the external os, as to prevent the escape of discharges. The external os is inflamed and reddened; the cervical canal may be dilated or severely constricted. In advanced cases the first annular fold of cervical mucous membrane may extend beyond the lips of external os; this extension may amount to as much as one inch, it is hard and firm to the touch. The posteriorly protruding mucous membrane readily bleeds to the touch. The third annular fold of the cervix may, in like manner to the first, extend through the internal os; in this condition the annular fold then commonly takes on the function of a valve, firmly closing the internal os to the passage of any fluids or discharges from the uterus. This condition often gives rise to hydrometra and pyometra.

Uterus.—As stated when discussing lesions of the cervix, cervicitis is almost always associated with endometritis. The infection and inflammation extends by continuity from one organ to the other. Which was the primary lesion, it is often impossible to say. One is frequently unable to distinguish endometritis from cerviticis in a clinical examination, but they so commonly occur in combination that it is almost always as well to presume endometritis present when the cervix is diseased.

Endometritis is inflammation of the endometrium, but this inflammation may extend to the metrium proper, producing true metritis. This organ may extend to the peritoneal covering of the uterus, giving rise to the condition known as para-metritis, or it may extend still further afield and attack the contiguous uterine organs within the pelvis, causing perimetritis, which may produce disseminated chronic or acute peritonitis. A diagnosis of metritis can be made by examination, the uterus is increased in size, the increase being symmetrical; the organ has lost its tone, is flaccid, the walls are thickened. By intra-uterine lavage the contents of the uterus can be ascertained. When pus is present in the uterus the condition is known as pyometra. Pus in large quantities may be found, especially, as already mentioned, when severe cervicitis prevents its escape. In this condition the pus may become inspissated, to form hard solid masses, generally to be found in the dependent ovarian end of uterus. If pyogenic organisms have not gained entrance into uterus, the contents are generally of a fluid non-purulent nature; this condition is hydrometra. In pluriparous cows, there may be present within the uterus either a desiccated or macerated fœtus.

Oviducts.—Salpingitis in its various forms may be present. In the mild condition it is impossible of diagnosis. The condition is caused very probably by an extension from the uterus, in rare cases it may be an extension from ovaries or peritoneum. In the oviduct, all stages of inflammation may be found. Should the inflammation cause closure of the ovarian and uterine extremity of the lumen of the tubes, the products of inflammation collect within the tube and should the duct be free from pus organisms hydrosalpinx is produced; should pus-producing organisms be present, pyosalpinx is established. Inflammation from the tube may extend to the pavillion of the ovary and set up pavillionitis, with possible adhesions of pavillion to ovary, and from here infection may extend to ovary itself and give rise to varying conditions of this organ. In pyosalpinx, the greatly dilated tube may rupture, to be followed by septic peritonitis.

Ovaries.—As already mentioned, infection may be carried to the ovaries by way of the oviducts, or it may be carried by the blood stream; if the infection is virulent, ovaritis may result. Clinically, ovaritis in its true sense is not commonly found; nevertheless, sufficient examples are on record to warrant its inclusion. The commonest lesions of ovary are cystic degeneration and cystic degeneration of the corpus luteum. Another physiological observation of this organ is retention of the corpus luteum in its various forms.

Cystic degeneration of the ovary proper, or, to be precise, of the Graafian follicles, is the lesion responsible for the condition of nymphomania, the causative factor for this lesion is not very well known. Cystic degeneration of the corpus luteum or corpora lutea is commonly associated with salpingitis and adherent pavillion or tube to ovary. Large ovarian cysts having a hæmorrhagic content are commonly found, rupture of which is very liable to cause death from hæmorrhage. Parovarian cysts are also frequently present—these arise from the remains of the Wolffian ducts. All the above conditions, with the exception of vesicular venereal disease and the nodular venereal disease, which are chiefly confined to the bovine species, are to be found in mares. In the latter, the various conditions are not so universal as in cattle, although, nevertheless, they are present in a vast number of animals. There is a condition very commonly present in thoroughbred mares, in which, primarily, the uterus is in subinvolution, with subsequent endometritis and cervicitis. These conditions appear to bear causative relation to the extreme nervous susceptibility of the subject. It is quite a common occurrence to find that mares which have been in training, or have raced a good deal, are sterile when sent to stud. The present day methods of training young animals to be ready to race at two years old have an evil influence on the subsequent breeding powers of the animal. During œstrum there is an extreme hæmorrhagic engorgement of the reproductive organs. If the animal is being raced during these periods there is a tendency for hypercongestion to occur, caused, probably, by the extreme excitability of the animal. By a continual recurrence of these conditions, there comes a time where postœstral involution is not established; this leads to chronic subinvolution, to be followed by endometritis and cervicitis, caused probably by an infection within the uterus, which has overcome the natural resistance to such invasion. Simultaneously with the changes within the uterus, changes occur outside that organ, such as morbid alterations in the ovaries and the uterine ligaments. The congestion also spreads to the broad ligament, ultimately causing atony and relaxation of these parts; the result being that the congested panetic uterus changes its normal position, one common clinical feature is the displacement upwards of the external os; so much so, that the junction of the superior wall of the vagina and the external os may form an acute angle, where normally it is a more or less right angle.

So far we have only dealt with the female. The male is liable to be infected with nodular venereal disease and vesicular venereal disease. These conditions are to be found on the prepuce and glans penis. Various pathogenic organisms invade the male reproductive organs, giving rise to various lesions; there may be present orchitis, epididymitis, acute or chronic inflammation or abscessation of the vesicular seminales and prostatitis. It is only by a careful clinical study of these parts that their diseased conditions may be recognised. The etiology of the various lesions mentioned above has not been dealt with. With the exception of the nodular venereal disease and vesicular disease, the causative agents of which have not been clearly demonstrated, all the other lesions result from varied infections. A varied infection is so commonly present, that in numerous cases it is impossible to attribute the lesions to any one organism. The commonest organisms found are *streptococci* and Bang's bacillus; there may also be *micrococci*, colon bacilli, *vibrion* or *spirella*, sometimes the *B. pyogenes*. Let us now see what influence the various infections described have upon the reproductive powers of the infected animal. Excepting the mild form of nodular venereal disease, all the conditions described are liable to cause sterility, and in the pregnant female to bring about abortion or premature birth. In the mild form of cervicitis and endometritis, conception may occur, probably to be followed by death and expulsion of the embryo at varying stages during pregnancy. The expulsion may occur at six, nine, twelve, or more weeks after conception and may not be noticed by the caretaker; in this case the animal is looked upon as having irregular œstral periods, whereas she had conceived, to be followed later by death of the embryo, with its subsequent unnoticed expulsion; or the embryo may be safely carried up to the fourth to seventh month, then expelled, when it can hardly escape the notice of the attendent—then the phenomenon is known as abortion, and is attributed to the orthodox contagious abortion, due, and due only, to Bang's bacillus. It is extraordinary how, in this country, the veterinary profession cling to the idea that abortion is a disease, moreover, a specific disease, caused by Bang's bacillus; whereas it is in reality a symptom of a multiplicity of diseases. There is the universal tendency to accept the voice of the oracle, without any attempt whatever to criticise the alleged facts; hence, we, as a profession, have remained so long in the dark regarding abortion and sterility. Two specific diseases, when attacking the uterus, give rise to abortion and sterility, these are tuberculosis and actinomycosis. The expulsion of an embryo or fœtus, the phenomenon of which is commonly called abortion, is brought about by some irritating agent acting directly on the uterus or by reflex action, or a combination of both. Any disease of the uterus of sufficient intensity to act directly or reflexly, or both together, will being about expulsion of its contents. To attribute these various conditions to one organism and one only, is like attributing all cases of wound infections to one specific organism. Life always faces the peril of death and, eventually, succumbs to it. Most living beings, whether plant or animal, die very young. Healthy adult animals regularly form special cells which have as their only aim the creation of new individuals similar to the parent. In all higher forms, the new individual is the result of the combination of two special cells, one designated as male, the other as female. Most of such specialised cells die without union with a corresponding cell to form a new organism. Of the

billions of cells discharged by the male at one coitus, one of these cells suffices for fertilisation, the others perish from innumerable causes. The union of this one with the microscopic ovum of the female fertilises it and produces a vigorous embryo, which later may be born as a healthy individual. In order to obtain the best results in animal reproduction, it is necessary that a perfectly genitally healthy male be mated with a genitally healthy female. The heifer calf, when born, has probably between 20,000 and 30,000 ova, each of which is potentially capable of being fertilised and of producing a calf, but the average cow kept for breeding becomes pregnant probably six or seven times and gives birth to about four healthy calves; for each ovum fertilised, about four or five thousand perish. Thus in healthy animals, death overtakes and destroys a vast majority of reproductive cells without their having taken part in fertilisation. Normally a cow or mare should produce one healthy calf or foal each year, dating from puberty until senile decay arrests the reproductive functions. How lamentably short of this standard the reproductive powers of our domestic animals fall. Large numbers of our young animals never breed; large numbers conceive, the process only to be followed later by expulsion of the embryo or fœtus; a number conceive and bring their young to full time, after birth to be striken down by such diseases as dysentery, pneumonia and pyo-septicæmia. All these disastrous conditions can be referred to infection and disease in one or other of the parents. A female with diseased genital organs may conceive and carry a fœtus to full term, and a live animal be born, but during intra-uterine life it may have become infected with the organisms present in the maternal uterus, causing a fœtal diarrhœa, as evidenced by the presence of fæces in the amniotic fluid; or symptoms of infection may not appear until some hours or days after birth, when dysentery or pneumonia or pyo-septicæmia may be exhibited; probably resulting in the death of the new born animal. Many veterinary bacteriologists will not admit the theory that post-natal infections of new born animals can be acquired during intra-uterine life. I contend this mode of infection is not a theory, but an established fact; for it has been conclusively proved that organisms present in the uterus and chorion of a female which has aborted, organisms of the same kind and species, can be recovered from various organs of the abort. Presumably it was infection by these bacteria that brought about death prior to its expulsion, therefore it is quite natural that any bacterial infection present prior to birth of a living fœtus, may also be present in the alimentary tract or tissues of the fœtus and be carried into its post-natal existence, to either lie dormant and harmless, or else become active and virulent and destroy or jeopardise the life of the young animals. It is to ante-natal infection that we must look for the explanation of those acute cases of pyo-septicæmia occurring in foals as early as twelve to twenty-four hours after birth.

By reviewing these facts, it at once becomes obvious how necessary it is, if the physiological standard of reproduction is at all likely to be attained, to breed only from animals whose sexual organs are clean and healthy. It is no use to have the cow sexually free from disease if the sexual organs of the bull are infected,for at coitus, the bull is liable to expel in his semen virulent organisms which infect the female, or the sperm cells may be so enfeebled from bacterial contamination that they may be in a state of degeneration and fail to fertilise the ovum, or, should fertilisation occur, an enfeebled delicate embryo will result; this delicacy may continue in the fœtus and on into extra-uterine life.

If the infection within the uterus is not too virulent, the normal uterine immunity may be sufficient to keep in it abeyance during the period of gestation and a live fœtus is born. But although the intra-uterine infection did not become sufficiently acute to produce lesions such as would result in death and expulsion of fœtus during some period of gestation, nevertheless the organism within the uterus may have gained access to the fœtus and promoted lesions after the fœtus has taken over separate existence. The mode of infection of the fœtus by organisms within the maternal tissues is supposed to be by way of the maternal blood stream in some instances, although certain authors nowadays will not admit of this method, their contention being that the placental filter, which consists of two layers of single cell epithelium (one the chorionic layer, the other the maternal placental layer), absolutely prevents the passage of bacteria from the maternal to fœtal circulation. But these same authors admit that the organisms of tuberculosis and syphilis can be transmitted in this manner, and it is also a well-known fact that smallpox can thus be transmitted from mother to fœtus. Another route, and one which may most commonly occur, is by way of the amniotic fluids. The bacteria present in the utero-chorionic space pass through the chorion, enter the amniotic fluid and are taken into the alimentary tract by fœtus drinking this fluid. If the infection is mild, the bacteria may not do any damage; if virulent, they may bring about death, with subsequent expulsion; or the fœtal infection may be held in abeyance while the fœtus is *in utero*, only to break out in an acute form during the early days of post-natal existence. Young animals, as a rule, do not possess immune bodies immediately after birth, at least none that can be demonstrated by the various sexological tests, but the demonstrable absence of immune bodies is not proof that the fœtus *in utero* was not possessed of these antibodies, for it is only the antibodies that are free in the humoral tissues which give a positive reaction in serological tests; those antibodies that are firmly fixed in the antigen-antibody association, do not give a reaction, unless dissociation of the antibody is first brought about.

Another remarkable thing which is commonly recognised in uterine infections is the fact that an infection which is so avirulent at time of conception as to allow conception to take place and the embryo

to develop, will often become accentuated as pregnancy advances and by the time the fifth, sixth or seventh month is reached will have become so virulent as to have produced such uterine lesions as will have caused the death of the fœtus, either directly or indirectly; this is the usual sequence of events seen in the common form of abortion. We must, therefore, presume that the uterus which normally, in the non-gravid state, has a high degree of immunity, loses this immunity during the period in which it is pregnant, and that accordingly as pregnancy advances the immunity becomes less. This phenomenon is specially marked in infection with Bang's bacillus, as this organism seems capable only of remaining in the uterus during the pregnant period. What is the explanation of this fact? It cannot be due to a decreased phogocytosis, as often occurs in pyogenic infections, where the diseased organ or part becomes cut off more or less from the normal blood supply by being surrounded by an inflammatory area of sclerotic fibrous tissue; for, during pregnancy, the blood supply to all parts of the uterus is enormously increased. I think its cause must be referred to the presence of the fœtus, which extracts some substance from the mother, reducing this substance below its normal physiological standard in the maternal tissues. In an article on "Antibodies Studies," by Huntron and Etris, these authors have demonstrated that during the antibody-antigen reaction, the two are held in firm combination by a salt present in the tissues, different kinds of antibody require different salts; thus hæmolytic antibody requires the presence of sodium chloride, and bactericidal antibody calcium phosphate. It may happen that during pregnancy these salts, necessary for the firm union of the immune body and its antigen, may become reduced, thereby inhibiting the action of the antibodies present, with a consequent decrease in immunity.

Young animals which recover from disease occurring in the early days of life often harbour infection in their genital organs; the bacteria, having come originally from the genital tract of the male or female parent, have an affinity for that system and commonly locate there. In heifers, many such infected are sterile, the number varying between five and twenty per cent. A considerable number of apparently healthy bulls are sterile from the first. The heifers which were diseased as calves, however well they may appear, later, should they conceive, largely abort, calve with difficulty or have retained afterbirth.

Renewing the various infections to which the generative organs of animals are exposed and the various sequelæ of those infections, we see that there is a cycle of continuity of infection from parents to offspring, therefore the whole problem of animal reproduction as free from disease as possible, reverts back to the axiom "only mate a healthy, and especially sexually healthy, female with a healthy, and especially sexually healthy, male."

Before closing I should like to say a few words on the control of genital infections. Thinking of abortion as a specific infection of the pregnant female has long beclouded the great question of animal reproduction, and adherence to this decadent view has cost, and is still costing, the nation untold millions. The quarantine of aborters has been recommended and practised for decades, without benefit. Serums, vaccines and bacterins have been tried experimentally and have been enthusiastically recommended by a few laboratory workers who were not in practical touch with the problem the breeder faces. The common vaccine used in this country and which consists of enormous doses of living virulent culture of Bang's bacilli, I consider to be the most iniquitous biologic product ever placed into the hands of the veterinary profession, and I am not alone in this opinion, which is held by numerous well-known workers on this subject. These enthusiasts have their contentions for the use of vaccines, chiefly on the experiments of Bland, who claimed to reduce the abortion rate in a herd of over one thousand animals from about thirty per cent. to about five per cent. When one critically analyses Bland's report, the beneficial results are not what they appear at first sight. The report indicates that before treatment was commenced thirty per cent. of the cows in the herd aborted, that is, out of every hundred cows thirty aborted and seventy gave birth to live, healthy calves. By vaccine treatment this thirty per cent. of abortions was reduced to five per cent., therefore, there was a decrease of twenty-five per cent.; but it does not say if there was a twenty-five per cent. increase of live healthy calves produced. It is of no benefit whatever to the breeder if the yearly percentage of abortions in his herd is decreased, if the percentage of healthy young calves is not increased. Here lies the whole crux of the matter so far as the breeder is concerned.

It is no use treating a cow which has aborted, the causative factor of which is some other organism than that of Bang's bacillus, by a vaccine prepared from *B. abortus*. Even if we could be positive that the infection which caused the abortion was caused solely by Bang's bacillus, there is no object in vaccinating this animal with enormous doses of vaccine; if an immunity is to be acquired against this specific infection, there are sufficient living bacteria resident in the tissues, other than the genital organs, to stimulate this immunity. True, vaccination may strengthen immunity by strengthening phagytosis, but a dead inert vaccine will have the same effect in this respect; certainly this increased immunity does not warrant the inoculation of an animal with living organisms, when it is a known fact the said animal may then become a productive source of infection and dissemination to other presumably healthy animals. This practice of vaccinating presumably healthy animals with abortus vaccine is a most pernicious belief—for we are introducing the very infection from which we wish to protect the animal. As already mentioned, the lesions responsible for the various diseases of the generative organs, and of which abortion is but a symptom, are never specific and confined to invasion by one organism alone, except

such specific infections as tuberculosis and actinomycosis. Having these facts in mind we at once see the futility of treating a symptom of various diseases by means of a specific vaccine. There are very many cases of an animal suffering from genital infections sufficient to cause her to abort, from which she may naturally free herself and subsequently regain her full reproductive powers. Again, there are a great number, once diseased, that never regain their fertility and powers of normal reproduction, unless properly treated and the infection removed. Not all animals treated regain their normal reproductive powers, some have part of their generative organs so changed by morbid lesions that the normal functions of these organs are lost for ever. Such animals are only fit for slaughter. As a last word, I would emphasise this—do not treat the symptoms for the disease, do not take the shadow for the substance ; it is time that the profession deviated its footsteps from the old beaten path of specific contagious abortion which led to nowhere, and seeks a way which will lead to deserved results. The way is to be found in the systematic diagnosis and treatment of the various diseases of the genital organs of male and female animals. Having removed these, we shall be well on the way to have removed and controlled their sequelæ in the new born animal. Like all other progress, this demands the application of thought, energy and unending diligence.

Startling Tuberculosis Test Suggestion.

That excellent group of milk producers—now more than 30 in number—who produce "Grade A milk," warranted free from dirt and evil microbes, have, says the *Daily Mail*, come up against a strange scientific fact. In herds absolutely free from tuberculosis one cow or another, sometimes a young heifer, has suddenly reacted to the tuberculosis test and been at once condemned.

It has now been discovered, or thought to have been discovered, by post-mortem and other means, that these condemned cows are, so to say, shamming tuberculosis. They have not got a trace of the disease in reality ; and the reason why they appear to have it lies in the previous tests. The injections made during the test are solely to blame for the false symptoms.

The Americans have made a similar discovery, now being further investigated, and if it is corroborated some new test will have to be devised. There can be no doubt at all that excellent heifers, quite free from disease, have been killed owing to wrong diagnosis.

Royal Sanitary Institute Congress.

Major-General The Rt. Hon. J. E. B. Seely, C.B., C.M.G., P.C., D.S.O., M.P., has consented to accept the office of President of the Thirty-third Congress of the Royal Sanitary Institute, to be held at Bournemouth from July 24th to 29th, 1922.

The Veterinary Record.

14th January, 1922.

MAGISTERIAL COMMENTS.

In our issue of last week we published a brief report of police court proceedings at Lambeth, at which a carman was charged with working a lame horse. Expert evidence as given by two veterinary surgeons of high repute, one called by the police and the other by the owner, proved the case to be one of "hæmoglobinuria," or as it used to be called "azoturia." This condition is so well known to veterinary surgeons and industrial horse owners that it would have called for no notice had it not been for the reported comments of the learned magistrate. He is stated to have said : "The evidence I have heard to-day is quite remarkable, but I am bound by it. As far as I can see, yesterday one would find a difficulty in threading one's way through the streets owing to the number of paralytic horses lying about them. I am somewhat astonished, because I was about the streets myself and did not see any."

The evidence of two professional men on a purely professional matter, given upon oath, may have appeared remarkable to a man ignorant of such matters, and it would appear advisable that Mr. Rooth should realise his own limitation of knowledge and ponder a while before expressing his surprise and suggesting his incredulity by the comment, "*but* I am bound by it," and even following this by sarcastic comments which read as though they might have been intended to wound the professional *amour propre* of the witnesses. It is just as well that such a magistrate is bound by the evidence and not by his own scepticism. It is difficult to understand how any otherwise well-balanced magistrate can justify the abuse of the privileges of his exalted position and cast a slur upon those who are present for the purpose of assisting him in arriving at a just decision regarding a case. But perhaps we are wrong. It may be that we are deficient in a sense of humour, and have failed miserably to appreciate what was intended as an effort to be funny. However the case was dismissed, and quite rightly. But surely the charge should never have been made, at least not against the unfortunate carman, whose horse was suddenly seized with a serious and frequently fatal illness.

From the information in our possession, which there is every reason to regard as correct, it is quite evident that if any charge of cruelty was to be pre-

ferred it most certainly should not have been made against the carman.

With regard to the occurrence of this affection it might interest the learned magistrate to know that it is comparatively common after all the stated holidays—Christmas, Easter, Whitsuntide, and August, and that this week one veterinary surgeon had nine cases, another eight cases, and another six cases, while in one cartage company's stables there were five cases, two of which were fatal.

The pity of it—that one man of learning in a responsible position should be incapable of respect for the learning of others.

Nominations to Council.

In the course of a few days, the voting papers for election to Council, R.C.V.S., will be issued to those members who are not in the British Isles, and thus come under the heading of "Foreign." There are the usual eight vacancies, one of which is vacant by death—that of Col. A. W. Mason. The seven retiring members have been nominated for re-election:—Messrs. J. Abson, H. Sumner, L. J. Blenkinsop, G. A. Banham, J. W. Brittlebank, J. C. Coleman, P. J. Howard. In addition there are Major-General Sir J. Moore, of the "Western Front," and later in Waziristan, and Mr. C. W. B. Revill, an experienced practitioner who qualified in 1886, and practised for some years at Welwyn, Hertfordshire, afterwards at Fairfield, Old Charlton, Kent (a practice held for many years by Mr. J. Oliphant). In 1902 he joined the B. of A. and was at Lee, Kent, till 1918, when he removed to Saffron Walden, Essex.

Royal College of Veterinary Surgeons.

ELECTION OF COUNCIL, JUNE, 1922.

The Foreign Voting Papers for the next election of Council will be issued early this month. The following nominations have been received to date:—

Nominees:—	*Proposers.*
ABSON, J., Sheffield.	O. CHARNOCK BRADLEY. Sir STEWART STOCKMAN.
BLENKINSOP, L. J., London.	O. CHARNOCK BRADLEY. F. T. G. HOBDAY.
BRITTLEBANK, J. W., Manchester.	F. HOPKIN. J. SPRUELL.
HUGHES, R., Oswestry.	F. HOPKIN. J. SPRUELL.
LIVESEY, G. H., Hove.	L. J. BLENKINSOP. F. T. G. HOBDAY.
MOORE, J., London.	F. W. GARNETT. F. T. G. HOBDAY.
REVILL, W. C. B., Saffron Walden.	T. PARKER. T. DUNLOP YOUNG.
SUMNER, H., Liverpool.	S. H. SLOCOCK. J. B. WOLSTENHOLME.

To the Fellows and Members of the Royal College of Veterinary Surgeons.

Gentlemen,

I ask for your vote at the next election to the Council of the R.C.V.S. I will give all possible support to the Council in their efforts to obtain the new Supplemental Charter, and I intend to do all I can to maintain our "one portal" system of entry to the profession.

I should like to see a complete revision of the subjects set for the examinations, so that the whole of a student's time spent at an affiliated school could be devoted to purely professional subjects. Chemistry, physics, and biology might well be relegated to the matriculations examinations.

I am strongly in favour of the appointment of Veterinary Officers of Health to Counties and Boroughs, and I would use all my influence to obtain adequate salaries for whole-time appointments, and on a similar scale to those granted to members of other learned professions.

Owing to the increasing number of members holding appointments or practising abroad and in the Colonies, the Council should set up a special committee to deal with their interests and requirements.

I have always been a strong advocate of a *rapprochement* with the medical profession, and I intend to do all I am able to influence the medical profession in our favour and gain its powerful aid in upholding and promoting the interests of the veterinary profession in Parliament and in the country generally.

Yours faithfully,

GEOFFREY HERBERT LIVESEY,
Hove, Sussex.

Proposers: G. Hobday, Esq., C.M.G., Sir L. Blenkinsop, K.C.B.

To the Fellows and Members of the Royal College of Veterinary Surgeons.

Sirs,

On retirement from the Army I offer myself for election to the Council of the Royal College of Veterinary Surgeons. Living near London, and being now a free agent, I should have opportunity and time to devote to the necessary duties in connection with the Council.

If elected, my best endeavours would be directed generally towards the advancement of veterinary science and the veterinary profession, and to the following questions in particular:—

1. The strict maintenance of the one portal system which is the only way of ensuring uniformity in qualification.

2. The raising of the standard of general education for admission to veterinary schools to the level at least of that accepted by all the other learned professions.

3. The approximation, on general lines, of veterinary training to that followed in the medical profession. If we are to reap the reward of appointments under the Ministries of State in research and in all matters

in which animals and animal products are concerned, we must have an equally efficient training as the medical experts, otherwise they are preferred to us. A closer association with the medical profession is salutary, but at the same time it is expedient that we should beautify our own shrines for worship.

4. Adequate remuneration for Government and Municipal Veterinary Officers.

5. Ways and means for improving clinical training at our schools, enlarging the sphere for practical training.

6. The safeguarding of the interests of officers of the R.A.V.C. in matters affecting their welfare, especially in relation to pay, promotion, advancement, etc.

Yours truly,
J. MOORE, Major-General.

Abstracts and Reviews.

The Importance of an Increased Carbon Dioxide Tension in the Growth of B. abortus Bang.

Some bacteriologists have recently shown that certain microbes can be isolated and cultivated with striking success in an atmosphere containing a high percentage of carbon dioxide gas. The method has been employed and advocated by WHERRY and ERVIN (1918) for cultivating tubercle bacilli, by CHAPIN (1918) for the gonococcus, and by KOHMANN (1919) for the meningococcus. By employing CO_2 gas in a similar way, Huddleson, of the Michigan Agricultural College, claims to have been able to obtain early and luxuriant growths of the cattle abortion organism, and that the growth is not dependent in fact, as has been generally held, upon a reduced oxygen tension.

There does not at present exist any definite knowledge as to the exact atmospheric conditions required for the primary isolation of the organism. BANG (1897) concluded that proper growth depended either upon the presence of an atmosphere of nearly pure oxygen or upon an atmosphere in which the oxygen tension was considerably less than that of the air. NOWAK (1908) succeeded in obtaining prolific growths by placing the inoculated media in a closed jar, together with cultures of the hay bacillus (*B. subtilis*), and incubating the jar at 37°C. for several days; he was under the impression that *B. subtilis* absorbed sufficient oxygen in its growth to reduce the tension of this gas in the jar to the degree which is necessary for the growth of the abortion organism. PREIZ again claimed to have successfully isolated the bacillus by using alkaline pyrogallol or acetylene gas for reducing the oxygen tension. HOLTH (1911) succeeded in growing it on the surface of agar slants in tubes sealed with paraffin; he believed that the proper tension was attained as the result of the organism using the oxygen over and over again.

FABYAN (1912) found that growth was governed by the amount of *B. subtilis* present when the organisms were grown in symbiosis—in other words, an excess of *B. subtilis* inhibited the growth of *B. abortus*. He attempted to grow the organism by reducing the oxygen tension by means of alkaline pyrogallol, but failed to obtain growth in every case. Huddleson himself also failed to obtain cultures by this method. Failure to cultivate the organism in an atmosphere in which the oxygen had been reduced by chemical means would constitute sufficient proof that we are at present not fully aware of the most suitable atmospheric conditions for growth.

STAFSETH (1920) at the Michigan Agricultural College Experimental Station has employed and recommended liver infusion agar for the isolation of the bacillus, and Huddleson has further studied this medium, indicated its proper reaction for growth, and discovered that the incorporation of gentian violet with it greatly facilitated the elimination of gross contaminating organisms.

In the hope of determining the composition of the atmosphere in which growth was obtained and thus establishing a more uniform and accurate method of isolating the organism, Huddleson first studied the changes that occur in enclosed vessels during the growth of *B. subtilis*. The reaction of the atmosphere, or its "hydrogen ion" content, was determined by using the so-called hydrogen ion colorimetric method, with bromthymol blue as indicator. Tubes of sterile indicator solution were prepared with a PH of 7. Six freshly inoculated agar slants of *B. subtilis* were each connected by means of rubber tubing to a tube of this solution and placed in the incubator at 37°C. After 24 hours a profuse growth of *B. subtilis* had taken place and the indicator solution gave a PH reading of 6·6; after 48 hours it was 6·5. The tubes were then removed from the incubator, three were disconnected from, and three left connected with the culture, at room temperature. The tubes of indicator solution that remained connected showed no change after standing for several days, but the disconnected tubes returned to the original PH of 7 in about four hours.

A similar experiment was then performed in which an additional agar slant, which had been smeared with a newly isolated strain of *B. abortus*, was introduced into each set by means of a T connecting tube. In 48 hours a good growth had taken place in all tubes, and the indicator solution gave a reading of PH 6·6.

An agar slant smeared with a recently isolated strain of *B. abortus* produced in a tube of indicator solution, with which it was connected, the same change in 5 days, at which time the first visible growth was noted.

Qualitative tests of the atmosphere within the tubes showed that the presence of CO_2 gas was responsible for the changes; this gas, it would appear, was given off as the organisms multiplied, and when the proper tension was established *B. abortus* grew readily.

Huddleson next ascertained the effects of introducing into an atmosphere a certain tension of CO_2 gas, generated by action of sulphuric acid upon calcium carbonate, on the growth of the abortion organism. The gas thus generated in a flask was collected in a graduated tube, its volume noted by allowing it to displace a measured volume of water, and later permitted to pass into a container of known volume, which enclosed the media inoculated with the abortion organism. In order to determine the percentage of CO_2 that was necessary to produce the desired PH for its growth, tubes of indicator solution (with a PH of 7) were placed in a series of closed glass containers, and different percentages of the air in them were replaced by CO_2 gas. It was found that, after allowing the vessels to stand for a few hours to permit the diffusion of the CO_2, the colour change was directly proportional to the percentage of CO_2 introduced. The jar containing 10 per cent. of this gas changed the indicator solution to the desired PH of 6·6—the change produced by cultures of *B. subtilis*.

Agar slants (liver infusion agar) were then inoculated with newly isolated strains of *B. abortus* and placed in a glass jar in which 10 per cent. of the air was replaced by CO_2 gas. The jar was then sealed and placed in an incubator at 37°C. At the end of a 24 hours' period, a luxuriant growth had appeared on the surface of each of the slants, whereas inoculated tubes placed in a jar containing no added CO_2 gas showed no growth, even after 48 hours.

Huddleson subsequently used this method for determining the presence of abortion bacilli in infected material obtained from a large number of abortion cases, and also in infected milk, with, it is said, gratifying success. In most cases, colonies became visible in 24 hours.

It is recommended that the percentage of CO_2 introduced into the jar should be closely observed, for an excess over the required amount will always inhibit the growth of *B. abortus*. Further, if the seed material contains a large number of coliform organisms, a vigorous growth of these bacilli is to be expected and this condition may also prevent the growth of *B. abortus*. In such cases a lower percentage of CO_2 should be introduced. The CO_2 content of the culture jar may be controlled in each instance by introducing a tube of indicator solution (PH 7), containing bromthymol blue as indicator.

[Beyond showing that an atmosphere in which a certain rather high percentage of the gases normally present has been displaced by CO_2 is favourable for the growth of *B. abortus*, Huddleson does not appear to have proved that this gas has any specific properties; it would be interesting to determine whether replacement to a certain degree by other gases, possibly inert gases, might have a like effect. It is obvious that in any case the oxygen tension is simultaneously correspondingly lowered.]

[HUDDLESON (J. Forest). *The Cornell Veterinarian*, 1921, July. Vol. II. No. 3, p. 210.]

J. T. E.

Association Report.

Southern Counties Veterinary Society.

POSITION JEOPARDISED BY APATHY.

A meeting of this Society was held at the Royal College of Veterinary Surgeons, 10 Red Lion Square, London, on Thursday, December 8th, when the President (Mr. J. W. McIntosh) presided, and the others present included Professor G. H. Wooldridge, Professor E. Brayley Reynolds, O.B.E., and Messrs. J. T. Angwin, F. Bullock, G. W. Bloxsome, W. S. King, H. A. MacCormack, C. Roberts, F. G. Samson, S. H. Slocock, A. C. Wild, and J. Willett.

On the proposition of Mr. SAMSON, seconded by Mr. MACCORMACK, the minutes of the last meeting as published in the *Veterinary Record* were taken as read and confirmed.

The HON. SECRETARY (Mr. Jas. T. Angwin) announced letters or telegrams of regret at inability to attend from Mr. F. Willett, Mr. Pack, and Mr. Burrell.

A letter was also read from the Royal Sanitary Institute inviting the Society to send delegates to next year's Congress at Bournemouth.

Mr. WILLETT proposed that the Society send a delegate, and this was seconded by Mr. SAMSON, who added that if they did send a delegate he should propose that they pay his expenses.

The PRESIDENT remarked that it was his view they ought to be represented at these gatherings, though, of course, it was entirely a question for the meeting to decide.

The proposition to send a delegate was agreed to, but, on the suggestion of Mr. WILLETT, the actual appointment of a delegate was deferred to the next meeting.

The HON. SECRETARY said the next matter he wished to bring forward was the apathy of the members and of the practitioners generally in the southern counties. As they would remember, at the last annual meeting in March, the President and himself were asked to draft a circular letter to be sent out to the members of the profession in the southern counties with a view to resuscitating, if possible, interest in the Society. Some two hundred notices were printed and copies were sent out to that number of practitioners in the southern counties, excluding Kent, which was covered by the South-Eastern Society, and the Metropolis, but he was sorry to say he had only had two applications for membership as a result, and those were the two members who were elected at the last meeting. The sending out of these circulars had involved an expense for printing and posting of something over £2, there was the expenses connected with the last meeting amounting to £2 19s. 10d., which he had to submit for payment that day, and there would be another £3 10s. to £3 15s. expenses in connection with that meeting, the attendance at which was less than a dozen, if they excluded their two visitors. He did not know what the feeling of the meeting was, but it was not very

encouraging to their President and the others who were trying to keep the Society going.

The PRESIDENT remarked that he could endorse all their Hon. Secretary had said. It certainly did show a lack of enthusiasm on the part of members in the southern counties, and unless greater enthusiasm could be restored amongst them it seemed to him useless to go on as a Society. He knew it was difficult for some members to get away from their districts to attend the meetings, but he could not help thinking that many of them might make a greater effort to be present if they had any real desire. It was most discouraging to those of them who were office-bearers and who were trying to keep the Society going, very often at a great deal of inconvenience to themselves, and it was becoming a matter for serious consideration as to whether it was worth while carrying on.

Mr. J. WILLETT said he felt like the President. He was a comparatively young member, since he only joined last year at the instance of their late President, Mr. Livesey, and he thought that if they could increase their numbers it might be possible for them to get a better attendance at their meetings. On the other hand, he for one was not prepared to carry on and continue to pay his subscription to the Society if there was not more enthusiasm displayed by the members of the profession generally. He was in hopes that with their President in the chair, and after their recent circular, they would have got a better attendance. But what had happened? The majority of those who attended the meetings were made up of metropolitan members who belonged to other Societies. He should hate to resign from the Society, but unless more enthusiasm was going to be shown by the practitioners in the southern counties he did not see the use of continuing. Everyone who had the interests of the Society at heart must deplore the poor attendances, and it was very disheartening.

The PRESIDENT added that perhaps he might read a letter which had been received from a Bournemouth practitioner, as it had some bearing on this subject. The letter was one of those received, he presumed, in answer to the circulars which they sent out, and the writer, in regretting that he could not at present join the Society, went on to say: "Under modern conditions it is difficult enough to make a living, largely on account of the amount of poaching that was done by quack medicine vendors and others during the war period, and the general practitioner is utterly neglected by the Government and by other authorities who might make use of his service for the benefit of the community." The writer also went on to say that he considered that the existence of the National V.M.A. was sufficient to guard the welfare of the profession, or should be. This, the President added, was one indication of the feeling which apparently prevailed.

Mr. SAMSON hoped Mr. Willett would not think of resigning just now, at any rate. Let him stick to them to the finish, which he was sorry to say he did not think would be very long, but let them not give up if they could possibly avoid it. He had belonged to the southern counties now for many years—he was a member of it in the late Mr. George Fleming's time, when they used to have meetings at Croydon, and he should be very sorry to see it dissolved, although he admitted the lack of interest was most disheartening to them all.

The PRESIDENT suggested that it might be desirable to put this matter on the agenda for discussion at their next meeting, which, he presumed, would be the annual meeting in March, with a view to getting the opinion of the members generally as to whether they should continue. At all events it might help to bring home to the members in the southern counties the importance of their rallying to the support of the Society if they wanted it to continue its good work.

Mr. SAMSON said he would be pleased to second this, and it was agreed that the President's suggestion should be adopted.

On the proposition of Mr. WILLETT, seconded by Mr. SAMSON, the President was asked to sign a letter in favour of the formation of a section of Comparative Medicine, at which both medical men and veterinary surgeons could mutually discuss matters.

The next item on the agenda was the election of new members, and

The PRESIDENT said he had intended proposing the name of Mr. W. S. King, one of their visitors that day, but in view of the conditions prevailing at the present time, he hardly felt justified in asking him to come forward. He therefore proposed to leave it over till they had decided what they were going to do as to the future of the Society. They knew they had his moral support in the meantime, and his election could very well come forward later on.

Mr. SAMSON remarked that he should also have liked to propose the name of their other visitor that day, Professor Brayley Reynolds, but he agreed with the President that it was not fair to ask him to join just at present.

PRESIDENTIAL ADDRESS.

The PRESIDENT next gave a brief presidential address. It was customary, he said, for the President when delivering an address to review the politics of the profession, but as he had so recently contributed a paper on this subject, he did not propose to again inflict upon them an exposition of these views. "In the first place," Mr. McIntosh proceeded, "I have to thank you for the honour you have done me by placing me in the chair, and I will do my best to fill it. I am afraid, however, I shall roll about a bit in the seat which has been so easily and so gracefully filled by many of my predecessors, particularly my immediate predecessor. Mr. Livesey occupied this chair for the period of over seven years, and at a time of great national anxiety, a time when most minds were blurred by passionate emotions of sorrow and indignation, and we owe him a deep debt of gratitude for his untiring efforts to keep the Society going under the most difficult and discouraging conditions. I cannot help thinking that the members of this division did not support him as well as they might have, and

certainly not as well as he deserved. In thinking over what I should say to you to-day, I carried my thoughts back over a period of nearly thirty years, which covers the whole of my professional and public career, and, viewing it as I did, this period spread like a great ocean before my mind's eye, I came to the conclusion that, notwithstanding the many vicissitudes of fortune the profession has had to undergo, more particularly in relation to popular opinion and respect, that it has really been worth while, and that if I had my life to live over again, I should probably follow the same course. There is no man, no matter how lofty may be his aim, or how earnest his endeavours, whose whole career is free from all taint of either selfishness, prejudice, or shortcomings, and there is no life complete without passion. I have known passion; it strengthens one for endurance, it fills with creative fire, but guided by common sense and educated by the wisdom and follies of the past, I have tried, in a true spirit of comradeship and humanity, to help onwards that inheritance which I have pledged myself to support. Probably our greatest weakness to-day is lack of unity, lack of comradeship, lack of fellowship. We have, partly from habit and partly by tradition, been inclined to look at matters from the individualistic rather than from the communal aspect. Some are satisfied with the irreducible minimum of knowledge, and are content to go on from day to day the same easy life, content in the idea that the world will last their time. They are fairly comfortable, they eat well, and they sleep soundly. For this class of individual, unprogressive, slow, and impenetrable, the field is undoubtedly becoming narrower, and the man who stands aloof in selfish isolation from the work of his brethren fails in his duty and within the measure of his personal influence, weakens the power and lessens the dignity of his profession. Surely our profession, with all its potentialities for good or evil, demands something more than a policy of drift. Everyone of us can be a 'cog,' no matter how small, in the great wheels of progress, but it is no use the little wheels turning if the main wheels are rusty and motionless. Let us cast aside this mantle of lethargy and indifference, take up the weapon of resolve, and, having drawn the eyes of the world in our direction, show them that while we may differ about this and that, still we can clasp hands heartily and join in the works of science and of brotherhood. Societies such as this supply the opportunity of helping one another by pooling our individual experiences and knowledge; and the belief of one man is strengthened by the belief and support of those around him; and, surely, this is a great service? The absence of the younger members from the work of our associations is particularly noticeable, undoubtedly to their loss as well as to ours. Youth, with its natural vivacity, finds all study a weariness; but let those who think thus take heed from those of us who have already begun life and who are in the midst of its turmoil, some of us approaching the evening of our days, that there is strength in association, and that it is in a true spirit of comradeship and sacrifice alone that we can hope to conquer those many difficulties and dangers which beset us through life's journey. At no time in the history of the profession was the need for unity and co-ordination greater than it is to-day. There can be no doubt in the minds of any impartial observer that the profession is at the present moment faced with problems of the very gravest importance to its future welfare, and, unless carefully piloted through this critical period, we may easily lose our freedom—even our very identity—which, I venture to think, would be fatal to the civilised life of the community. There is no use saying nice things about the situation. It doesn't lend itself to pleasant platitudes, and the circumstances are accentuated by a Governmental indifference which is demoralising to any administration, no matter how democratic may be the principles upon which it is based. It may be remarked that the relation of the medical profession and the Government has been steadily improving during the last few years, owing to the acceptance by Government departments of the necessity of consulting the medical profession on matters in which medicine is deeply interested; and this is undoubtedly as it should be. I hope the veterinary profession will be similarly recognised, and that those Government Departments which exercise a controlling influence on matters in which we are interested will come to realise that consultation with elected representatives of this body corporate is essential if we are to have a clear vision of the needs of the future, and in the best interests of the nation." (Applause.)

At the invitation of the PRESIDENT, Mr. J. Willett and Professor E. Brayley Reynolds subsequently introduced several cases of interest for discussion, for which they were cordially thanked, on the proposition of the PRESIDENT, seconded by Mr. SAMSON, but a report of these is held over to a subsequent issue.

JAS. T. ANGWIN, *Hon. Sec.*

South African Veterinary Association.

GENERAL MEETING.

(*Continued.*)

Clause 24.

The PRESIDENT said it was necessary to provide funds, and this was a matter on which any Minister would have to be satisfied before he would consent to introduce the Bill into Parliament. The travelling expenses of members of Council and the Registrar's salary would have to be provided for.

Professor DE KOCK suggested that there should be one substantial registration fee instead of an annual subscription; he suggested £10.

Dr. DU TOIT thought that they might with advantage work in similar lines to the Public Service Association, in which body members of Council who could not attend a meeting were allowed to nominate a substitute living in Pretoria.

Mr. DIXON enquired what funds the Association had in hand.

The PRESIDENT explained that the Association was quite a separate body from the proposed Council, and any funds in hand were required for fighting purposes.

Mr. NESER asked what degree of protection the Bill was going to confer, and thought that the people who got the benefit should be the ones to pay.

The PRESIDENT said the Bill protected every veterinary surgeon, whether he was in Government or Municipal service, or in private practice, as it fixed the standard of qualifications. It was necessary to fix a sum which would cover expenses.

Major TATE asked whether it was not possible to amalgamate with some other body and so lessen expenses.

The PRESIDENT said this might be possible. The fee fixed upon now would be embodied in the Act of Parliament.

Lt.-Colonel BUSH proposed an annual subscription of £2 2s. 0d., which he considered the maximum figure members should be expected to pay.

Dr. DU TOIT agreed with Mr. Neser on the points he raised, but as it was absolutely necessary to get money, he seconded Colonel Bush's proposal.

CARRIED.

Dr. ANDREWS suggested that, if necessary, the registration fee should be increased. He suggested five guineas.

Professor DE KOCK seconded.

Mr. NESER proposed that private practitioners should pay four guineas subscription.

Mr. MITCHELL thought that the proposal did not allow for enough money to cover expenses. The Registrar's salary would be at least £300 per annum, and travelling expenses for members of Council would bring the annual expenditure up to about £500.

After further discussion, Dr. Andrew's proposal was put to the meeting and Carried.

Clause 26.

The PRESIDENT read the proposed amendment.

Dr. DU TOIT proposed that the matter be referred to Council, with power to act.

Professor DE KOCK seconded.

AGREED.

Clause 36.

The amendment, as proposed by the Council, was agreed to.

The PRESIDENT said that as the various amendments had now been thoroughly discussed and agreed upon, the Bill would be printed and the Minister interviewed with a view to getting the Bill introduced into Parliament at the earliest possible date. They were in a stronger position than previously, and he hoped that this time they would be successful.

Dr. DU TOIT expressed gratification of the unanimity displayed. The Act was a great undertaking, and he felt sure that if passed it would be for the lasting good of the profession in South Africa.

Dr. DU TOIT proposed that the name of the Association should be changed to "South African Veterinary Medical Association."

The PRESIDENT said that notice of the motion must be given to the Secretary, and the matter would be brought up at the next general meeting, which would probably be held about Easter time.

Lt.-Colonel BUSH read a statement which showed the financial position of the Association.

It was agreed that the President and Treasurer should be authorised to withdraw the money from the Post Office Savings Bank and invest £550 on fixed deposit in the Standard Bank.

Dr. DU TOIT proposed a vote of thanks to the Chairman.

CARRIED.

The meeting then closed.

Notes and News.

Anthrax Conpensation Claim.

COUNTY COUNCIL AND LIABILITY.

Particulars are given in a minute that comes before the next meeting of the Aberdeen County Council with regard to a claim for compensation in respect of the death of a sow from anthrax. On 22nd October last, Mr. W. Todd Elder, M.R.C.V.S., Wartle, as an inspector appointed by the Local Authority, was called to examine the carcase of a dairy cow which had died somewhat suddenly on that date at the farm of Pardes, Daviot, and, having examined the carcase and made a microscopical examination of blood taken from the animal, he certified that the cause of death was not anthrax but, he believed, indigestion. The owner, therefore, proceeded to bleed the animal prior to its removal to the slaughter-house at Inverurie, and the blood was allowed to run into the courtyard, where two breeding sows and a boar were, and each of these animals drank a part of the blood.

When the carcase was being dressed at Inverurie, the butcher suspected that it was a case of anthrax, and, on the veterinary inspector for the burgh being called, he was of the opinion that the cow had died from anthrax, and forwarded samples of blood for examination at the laboratory of the Ministry of Agriculture and Fisheries. The veterinary officers of the Ministry, on 27th October, reported that, in their opinion, the case was one of anthrax. One of the sows above referred to died on 27th October, and the veterinary officers of the Ministry stated that this case also was one of anthrax.

The sow that died belonged to Mr. Alexander Gauld, Burnside, Pitcaple, who has made a claim against the Local Authority for payment of the value of the sow, namely, £19, on the ground, apparently, that the sow contracted anthrax in consequence of the action taken by the farmer as the result of the veterinary inspector's failure to diagnose the disease.

The Clerk advised the committee that, even assuming that there was negligence on the part of the inspector in dealing with the case, the Local Authority are not legally liable to compensate the owner in respect that, although they are required by the statute to appoint inspectors for the purposes of the Act and relative Orders made by the Ministry of Agriculture, the powers and duties of the inspectors are not delegated to or imposed upon the inspectors by the Local Authority but by the Ministry. The committee were referred to the decision of the Court of King's Bench in the case of Stanbury *v.* Exeter Corporation, 25th October, 1905, 2 K.B., 838.

By ten votes to six the Executive Committee recommended that the Council make no payment. The motion favoured an ex-gratia payment of £5 to the owner.—*Aberdeen Journal.*

Veterinary Service in the Hebrides.

At a meeting of the Local Authority for Inverness, held at Inverness on 25th November, a letter was read from the Board of Agriculture with reference to the veterinary service in the islands. In the discussion it was pointed out that a tremendous expense was involved in sending veterinary surgeons from Inverness to the West, and it was thought some arrangement could be made whereby a veterinary surgeon stationed at Stornoway could perform the work in the Outer Isles. It was held to be important that the Authority should have some arrangement with a veterinary surgeon stationed in the Lews. It was agreed that the Clerk should get more information on the subject before the Authority dealt finally with the matter.

Wholesale Livestock Breeding.

At Dorset Quarter Sessions, Dorchester, recently, Walter Moseley, a smallholder, of Hardington Moor, Somerset, was sentenced to five years' penal servitude and two years' police supervision for stealing cattle and sheep. The prisoner, who pleaded "Guilty," had served five years' penal servitude for a similar offence, when he stole 235 sheep and disposed of them at Smithfield. In the present case he raided neighbouring farms and drove the stolen livestock to his own holding.

Obituary.

Mr. Thomas Shepherd.

The public of the Wigan district will regret to learn, says the *Wigan Observer* of December 31st, of the death of Mr. Thomas Shepherd, a well-known veterinary surgeon, of Liverpool, who was a native of Wigan, the sad event taking place suddenly on Thursday, December 22nd, following a seizure while pursuing his professional duties. The deceased gentleman, who was sixty years of age, was the son of the late Mr. Richard Shepherd, butcher, of Scholes. As a young man, Mr. Shepherd was apprenticed with the late Mr. William Worthington, veterinary surgeon, of Wallgate, and Queen Street, Wigan, and he studied at Edinburgh University. After qualifying as a veterinary surgeon, he practised for a time at Lancaster, but later became associated with Messrs. H. and S. Sumner, veterinary surgeons, of Liverpool, marrying Miss Sumner, daughter of one of the principals. He was a brother-in-law of Mr. Ralph Rimmer, veterinary surgeon, of Kendal, and formerly of Wigan, who married his sister. The deceased gentleman leaves a widow and a son.

The funeral took place on December 26th, when a service was held at St. Matthew's Church, Bootle, the interment following at Kirkdale Cemetery. The mourners included the following veterinary surgeons: Messrs. R. Shepherd (brother), R. Rimmer, H. Sumner, and Stafford Jackson, while Dr. Rimmer and Councillor Dr. R. Sumner were also present.

Mr. Shepherd died at his residence, 62 Litherland Road, Bootle. He was very highly respected in the district, and was a member of the firm of Messrs. J. and H. Sumner, veterinary surgeons, of Liverpool and Bootle.

Kirke.—On Jan. 1st, of heart failure, Frederick Armstrong Kirke, M.R.C.V.S. (L.), the beloved father of Mrs. Walter Long, The Elms, Tytherton, Chippenham, Wilts.

Army Veterinary Service.

London Gazette, War Office, Regular Forces.

January 3rd.—Temp. Capt. H. N. Howell relinquishes his commission on completion of service (Dec. 11th, 1919), and retains the rank of Captain.

January 9th.—The following temp. Capts. relinquish their commissions on completion of service:—G. D. Norman (Dec. 2nd, 1921), and is granted rank of Major; W. T. Ferguson (Dec. 5th, 1921), and retains rank of Captain.

The following temp. Qrmrs. and Capts. relinquish their commissions on completion of service and retain their rank:—J. Daunt (July 15th, 1921); J. R. Devereux (June 26th, 1919); J. Garwood (May 31st, 1919).

Diseases of Animals Acts, 1894 to 1914. Summary of Returns.

Period.	Rabies. Cases Confirmed: Dogs.	Rabies. Cases Confirmed: Other Animals.	Anthrax. Outbreaks confirmed.	Anthrax. Animals attacked.	Foot-and-Mouth Disease. Outbreaks confirmed.	Foot-and-Mouth Disease. Animals slaughtered as diseased or exposed to infection.	Glanders (including Farcy).* Outbreaks reported by the Local Authorities.	Glanders (including Farcy).* Animals attacked.	Parasitic Mange.* Outbreaks reported by the Local Authorities.	Parasitic Mange.* Animals attacked.	Sheep Scab. Outbreaks reported by the Local Authorities.	Swine Fever. Outbreaks confirmed.	Swine Fever. Swine slaughtered as diseased or exposed to infection
GT. BRITAIN.													
Week ended 31st December, 1921	...	...	10	11	...	...	...	...	48	71	61	23	12
Total for 53 weeks, 1921 ...	22	1	515	650	44	3085	11	42	2049	3094	732	1286	462
Corresponding period in 1920	41	...	459	547	93	11373	15	25	3564	5812	479	1816	715
Corresponding period in 1919	150	5	234	313	75	3437	25	61	5003	9773	438	2305	1039
Corresponding period in 1918	98	10	245	282	3	49	34	98	4483	84 2	352	1407	5 2
IRELAND.													
Week ended 31st December, 1921	...	...	...	...	..	...	..	...	1		5	1	1
Total for 53 weeks, 1921	1	1	7	77	...	...			78		283	120	155

Note. The figures for the current year are approximate only. *Excluding outbreaks in Army horses.

Note.—The figures for the current year are approximate only.

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